

REMARKS

Applicant thanks the Examiner for acknowledging Applicant's claim to foreign priority under 35 U.S.C. § 119(a)-(d), and for confirming that the certified copy of the priority document has been received at the Patent Office.

Information Disclosure Statement:

Applicant thanks the Examiner for initialing the references listed on the PTO-1449 form submitted with the application, thereby confirming that these references have been considered.

Election/Restriction:

Applicant thanks the Examiner for acknowledging Applicant's election of Species (a) shown in Figures 1 and 42, and that the election was made without traverse. Applicant also thanks the Examiner for agreeing that claims 1-17, 32-33 and 36-37 are readable on the elected Species (a).

Oath/Declaration:

The Examiner has objected to the Oath/Declaration, stating that the Oath/Declaration failed to comply with the requirements of 37 C.F.R. § 1.67(a). Specifically, the Examiner has indicated that the Oath/Declaration is defective because it fails to list the citizenship of each of the inventors.

Applicant respectfully submits herewith a replacement Oath/Declaration which identifies the citizenship of each of the inventors of the above referenced application. Applicant hereby requests the Examiner reconsider and withdraw the objection to the Oath/Declaration.

Drawings:

The Examiner has objected to the drawings under 37 C.F.R. § 1.83(a) asserting that the drawings fail to show every feature of the invention as set forth in the claims. In view of the following discussions, Applicant respectfully disagrees.

Claims 4 & 15:

With regard to claims 4 and 15 the Examiner asserts that the drawings fail to show a “mechanism for adjusting the distance between the diffraction image plane and the sample.” *See* Office Action dated August 22, 2002, page 3, para. 5. However, Applicant respectfully submits that the “mechanism for adjusting” is adequately shown in the drawings.

Applicant notes on page 36, of the present application, it is stated that the “condenser lens 2 is movable in the direction of the optical axis 7 against the position of the stage 5. By the condenser lens 2 moved in the direction of the optical axis 7, the distance between the sample 6 mounted on the stage 5 and the converging point 4, i.e., the distance between the sample 6 and the diffraction image plane 8, can be changed.” *See* Specification, page 36. Applicant notes that the condenser lens 2 is shown adequately in at least Figure 1 of the present application, and thus submits that the drawings adequately disclose “an adjusting mechanism adapted to arbitrarily change a distance between said diffraction image plane and said sample.” *See* claims 4 and 15.

Claims 5 and 16:

With regard to claims 5 and 16, the Examiner has indicated that the “mechanism for adjusting/aligning the direction of light through the spatial filter and the optical axis of the objective lens” is not shown in the drawings. *See* Office Action, page 3, para. 6. However,

Applicant respectfully submits that the “mechanism for adjusting” is adequately shown in the drawings.

In reviewing the specification of the above referenced application, Applicant notes that the present application discloses a number of methods by which diffracted light can be selected with which the optical image of the sample to be seen is formed. Specifically, the specification states that “either the form of the spatial filter, the position thereof on the diffraction image plane, or the angle of optical axis of illumination light with respect to the optical axis” can be used for this purpose. *See* Specification, page 40, lines 17-22. Further, the specification indicates that when an image is to be formed by use of higher-order diffracted light, the light participating in the imaging can deviate from the optical axis of the objective lens. This deviation can cause a greater image distortion. To address this image distortion better image results will be obtained if the selected diffracted light is disposed as close as possible to the optical axis by “adjusting the condenser lens, for example.” *See id.* at page 43, lines 11-18. The specification further indicates that although “the optical axis of [the] condenser lens 2 and the optical axis of [the] objective lens 10 are held parallel” in the embodiment shown in the present application, the application discloses that “they may be configured such that the angle of [the] optical axis of [the] condenser lens 2 with respect to the optical axis of [the] objective lens 10 is made variable. When the angle of the optical axis of the [the] condenser lens is changed, the diffracted light participating in observation can be altered, whereby the image information for seeing the texture and orientation can be enhanced.” *See id.* at page 44, lines 3-11.

Applicant submits that the above discussion, and the corresponding disclosure in the above referenced application, sufficiently discloses a “mechanism for adjusting/aligning the direction of light through the spatial filter and the optical axis of the objective lens” as set forth in claims 5 and 16. For example, by moving the condenser lens 2, as discussed above, an angle would be formed between the optical axis of the light source and the optical axis of the objective lens, and thus the optical axis of the diffracted light comes into conformity with the optical axis of the objective lens. Therefore, the specification discloses that at least the condenser lens can be used to adjust the direction of light through the spatial filter and the optical axis of the objective lens.

Therefore, in view of the above discussions, Applicant respectfully submits that the drawings adequately disclose, to one of ordinary skill in the art, the features set forth in claims 4-5 and 15-16, and hereby requests the Examiner reconsider and withdraw the above objection to the drawings. Further, Applicant notes that the above discussions are not intended to limit the scope of the present claims in any way, but are merely intended to show that the above claims are adequately shown and disclosed in the drawings of the above referenced application.

Specification/Abstract:

The Examiner has objected to the Abstract of the Specification, under MPEP § 608.01(b) for the improper use of “means” within the Abstract. Applicant has amended the Abstract as shown in the attached Appendix to address the Examiner’s concerns with regard to the Abstract, and hereby requests the Examiner reconsider and withdraw the above objection to the Abstract.

Applicant also notes that the Examiner has objected to the "Summary of the Invention," stating that the summary, at 27 pages, is too long. Applicant respectfully traverses this objection. Applicant notes that both 37 C.F.R. § 1.73 and MPEP § 608.01(d) only require that the Summary of the Invention "be commensurate with the invention as claimed and any object recited should be that of the invention as claimed." It is further noted that there is no requirement of brevity with regard to the Summary of the Invention. It is only stated that "the subject matter of the invention should be described in one or more clear, concise sentences or paragraphs." MPEP § 608.01(d).

Finally, Applicant notes that the above referenced application discloses at least four different embodiments of an optical microscope apparatus, as well as at least four different methods of use of the apparatus. Thus, Applicant submits that the length of the Summary of the Invention is not too long, and satisfies the requirements of both 37 C.F.R. § 1.73 and MPEP § 608.01(d).

Allowable Subject Matter:

Applicant thanks the Examiner for indicating that there although claims 3-5 and 14-17 have been objected to, these claims would be allowable if claims 3 and 14 were written in independent form. Further, Applicant thanks the Examiner for indicating that claims 32 and 33 would be allowable if written to overcome their rejection under 35 U.S.C. § 112, 2nd paragraph, discussed below.

Claim Rejections:

Claims 1-39 are all the claims pending in the application, and currently only claims 1-17, 32-33 and 36-37 have been examined on the merits. All of the examined claims stand rejected.

35 U.S.C. § 112, 1st Paragraph Rejection - Claims 36 and 37:

Claims 36 and 37 stand rejected under 35 U.S.C. § 112, 1st paragraph for failing to enable one of ordinary skill in the art to make or use the invention, as set forth in these respective claims. In view of the following discussion, Applicant respectfully disagrees.

The Examiner asserts that both claims 36 and 37 lack “enablement” because the written description of the above application does not “reasonably provide enablement for a method of observing an image of a sample by using a microscope having an illumination system, a spatial filter disposed in or near the diffracting image plane and an observation system having an objective lens wherein the method comprises only one step of moving the position of the converging point of [the] illuminating light.” *See* Office Action, page 5, para. 12.

As an initial matter, Applicant notes that the Examiner’s characterization of claims 36 and 37 as requiring “only one step of moving the position of the converging point” fails to accurately characterize the scope of the present claims. *Id.* (emphasis added). Claims 36 and 37 both state that the method “comprises” the step of changing the position of the converging point, not the method “consists of” or “consists essentially of.” The use of the language “comprises” indicates that Applicant contemplates that additional steps may be used in the observing method recited in claims 36 and 37, and not only one, single step can be used.

However, additionally, Applicant notes that on page 41, of the present application, it is stated that “the size of the diffraction image is adjustable by changing the position of diverging point of illumination light in the optical axis direction of the objective lens.” Specification at 41. Thus, if one of ordinary skill in the art were viewing a diffraction image through an optical microscope apparatus, as claimed, and merely wished to adjust the size of the diffraction image, they can do so with a single step, as recited in the claims.

It is for at least the reasons set forth above, that Applicant submits that one of ordinary skill in the art would be able to make and use the present invention as set forth in claims 36 and 37 and, as such, Applicant hereby requests the Examiner reconsider and withdraw the above 35 U.S.C. § 112, 1st paragraph rejection of these claims.

Applicant further notes that because there is no prior art rejection of claims 36 and 37, and because Applicant has adequately addressed the 35 U.S.C. § 112, 2nd paragraph rejection of these claims (discussed below), these claims are now in allowable condition.

35 U.S.C. § 112, 2nd Paragraph Rejection - Claims 1-17, 32-33, and 36-37:

Claims 1-17, 32-33, and 36-37 stand rejected under 35 U.S.C. § 112, 2nd paragraph as being indefinite. Applicant has amended claims 1, 2, 13, 32, 33, 36 and 37 as shown in the attached Appendix to clarify the claimed invention, and to address the Examiner’s concerns regarding these claims. In view of these amendments, Applicant submits that the amended claims clearly claim the present invention, and hereby requests the Examiner reconsider and withdraw the above 35 U.S.C. § 112, 2nd paragraph rejection of claims 1, 2, 13, 32, 33, 36 and 37, and the claims which depend thereon.

Applicant notes that the above referenced claim amendments are merely intended to clarify the claimed invention, and are not intended to narrow the scope or spirit of the original claims in any way.

35 U.S.C. § 102(b) Rejection - Claim 1:

Claim 1 stands rejected under 35 U.S.C. § 102(b) as being anticipated by either one of U.S. Patent No. 4,255,014 to Ellis and U.S. Patent No. 5,305,139 to Greenberg. Applicant respectfully disagrees with regard to both of the above references, and addresses each individually below.

U.S. Patent No. 4,255,014 to Ellis:

Ellis discloses an apparatus for viewing a phase phenomena which includes, *inter alia*, an illuminator 10, a stage 20 on which an object to be viewed can be placed, an objective lens 30, an attenuator 40 and an ocular 60. *See* Ellis Figure 1, and col. 6, lines 35-55. The illuminator comprises a source 12 of electromagnetic radiation, a lamp collector lens 13, a field diaphragm 14, a condenser iris 15, an adjustable stop 16 and a condenser lens 18. *See id.* However, unlike the present invention, Applicant notes that in Ellis it is “apparent from the ray traces shown in Figure 1, the beam of electromagnetic radiation incident on the front focal plane of the condenser has a substantial diameter and is by no means a point source at the front focal plane ... Moreover, this beam is diverging at the front focal plane.” *Id.* at col. 6, lines 49-54.

In the present invention, the optical microscope contains an “illuminating means for emitting an illumination light as a convergent beam which converges at a point in space.” *See* claim 1. Further, the present invention contains “a sample mounting table for mounting a sample

in front of [the] converging point of [the] illumination light.” *Id.* There is no disclosure in Ellis, of any kind, of placing the stage **20** in front of the converging point of a converging beam of illumination light, being illuminated from the illuminator **10**. It is for at least this reason that Ellis fails to disclose each and every element of the present invention as set forth in claim 1.

U.S. Patent No. 5,305,139 to Greenberg:

Greenberg discloses an illumination system and apparatus which contains means to shift a light beam path **11**, a condenser lens means **12** which has an optical axis **13**, an objective lens means **14** having an optical axis **16**, and a specimen support stage **17** disposed between the condenser **12** and the objective means **14**. *See* Figures 1A-1C and 2, and col. 6, line 64 to col. 7, line 24. However, as shown in Figures 1A to 1C and 2, in Greenberg the condenser means **12** is disposed between the light source and the support stage **17**.

As stated above, in the present invention, the “sample mounting table for mounting a sample” is located in front of the converging point of the convergent beam of illumination light being emitted from the illuminating means. *See* claim 1. As with Ellis, there is no disclosure, in Greenberg, of this aspect of the claimed invention. Specifically, there is no disclosure that the sample support is located in front of a converging point of the convergent beam of illuminating light emitted by the illuminator. Thus, as with Ellis, Greenberg fails to disclose each and every feature of the claimed invention, as set forth in claim 1.

Therefore, in view of the above discussions, Applicant respectfully submits that neither Ellis nor Greenberg disclose, teach or suggest each and every feature of the claimed invention, as

recited in claim 1, and hereby requests the Examiner reconsider and withdraw the above 35 U.S.C. § 102(b) rejection of this claim.

35 U.S.C. § 103(a) Rejection - Claim 2:

Claim 2 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Greenberg in view of U.S. Patent No. 6,043,475 to Shimada et al. However, since claim 2 depends on claim 1, and because Shimada fails to cure the deficient teachings of Greenberg with respect to claim 1, Applicant respectfully submits that claim 2 is also allowable, at least by reason of its dependence.

35 U.S.C. § 103(a) Rejection - Claims 7-12:

Claims 7-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Greenberg in view of Ellis. As previously discussed above, with regard to claim 1, neither the Ellis or Greenberg references disclose the present invention as recited in claim 1. Thus, the mere combination of these references fails to cure the deficient teachings of each of the references individually. Therefore, as with claim 2, Applicant submits that claims 7-12 are also allowable, at least by reason of their dependence on claim 1.

35 U.S.C. § 103(a) Rejection - Claim 13:

Claim 13 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Greenberg in view of Ellis, in further view of Shimada. Again, since Shimada fails to cure the deficient teachings of both Ellis and Greenberg, with regard to claim 1, Applicant submits that claim 13 is allowable, at least by reason of its dependence on claim 1, through claim 7.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 09/810,523

Our Ref.: Q65488
Art Unit: 2872

Conclusion:

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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APPENDIX
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The claims are amended as follows:

1. (Amended) An optical microscope apparatus, comprising:

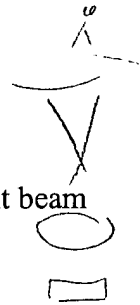
illuminating means for emitting as an illumination light as a convergent beam
which converges ~~converging~~ at a point in a space;

a sample mounting table for mounting a sample in front of said converging point
of said illumination light; and

an objective lens positioned after said converging point such that said illumination
light is incident thereon,

wherein said illumination light is transmitted through or reflected by said sample
and wherein said illumination light converges at disposed such that said illumination light
is incident thereon after light transmitted through or reflected by said sample is once
~~converged~~ at said converging point.

2. (Amended) An optical microscope apparatus according to claim 1, wherein said
objective lens is adapted to be focused on either one ~~each~~ of a diffraction image plane,
orthogonal to an optical axis of said illumination light, including said converging point, and said
sample.



8. (Amended) An optical microscope apparatus according to claim 7, wherein said polarizer and said analyzer are rotatable about an optical axis of incident light.

13. (Amended) An optical microscope apparatus according to claim 7, wherein said objective lens is adapted to be focused on either one ~~each~~ of a diffraction image plane, orthogonal to an optical axis of said illumination light, including said converging point, and said sample.

32. (Amended) A microscope observing method using an optical microscope apparatus comprising illuminating means for emitting as an illumination light as a convergent beam which converges ~~converging~~ at a point in a space; a sample mounting table for mounting a sample in front of said converging point of said illumination light; an objective lens positioned after said converging point such that said illumination light is incident thereon, wherein said illumination light is transmitted through or reflected by said sample and wherein said illumination light converges at ~~disposed such that said illumination light is incident thereon after light transmitted through or reflected by said sample is once converged at said converging point;~~ and a spatial filter, disposed at a position of a diffraction image plane, for selectively blocking a part of said illumination light transmitted through or reflected by said sample, said diffraction image plane being orthogonal to an optical axis of said illumination light and including said converging point; said objective lens being adapted to be focused on each of said diffraction image plane and said sample;

said method comprising the steps of focusing said objective lens onto said diffraction image plane so as to observe a diffraction image of said sample formed on said diffraction image plane by said illumination light and adjusting said spatial filter such that only light from a desirable region of said diffraction image is transmitted therethrough; and then focusing said objective lens onto said sample so as to observe said sample with said light transmitted through said spatial filter.

33. (Amended) A microscope observing method using an optical microscope apparatus comprising illuminating means for emitting as an illumination light as a convergent beam which converges ~~converging~~ at a point in a space; a sample mounting table for mounting a sample in front of said converging point of said illumination light; an objective lens positioned after said converging point such that said illumination light is incident thereon, wherein said illumination light is transmitted through or reflected by said sample and wherein said illumination light converges at ~~disposed such that said illumination light is incident thereon after light transmitted through or reflected by said sample is once converged at said converging point;~~ a polarizer disposed between said illuminating means and sample mounting table; an analyzer disposed between said sample mounting table and eyepiece; and a spatial filter, disposed at a position of a diffraction image plane, for selectively blocking a part of said illumination light transmitted through or reflected by said sample, said diffraction image plane being orthogonal to an optical axis of said illumination light and including said converging point; said objective lens being adapted to be focused on each of said diffraction image plane and said sample;

said method comprising the steps of focusing said objective lens onto said diffraction image plane so as to observe a diffraction image of said sample formed on said diffraction image plane by said illumination light and adjusting said spatial filter such that only light from a desirable region of said diffraction image is transmitted therethrough; and then focusing said objective lens onto said sample so as to observe said sample with said light transmitted through said spatial filter.

36. (Amended) A microscope observing method using an optical microscope apparatus comprising illuminating means for emitting as an illumination light as a convergent beam which converges ~~converging~~ at a point in a space; a sample mounting table for mounting a sample in front of said converging point of said illumination light; an objective lens positioned after said converging point such that said illumination light is incident thereon, wherein said illumination light is transmitted through or reflected by said sample and wherein said illumination light converges at ~~disposed such that said illumination light is incident thereon after light transmitted through or reflected by said sample is once converged at~~ said converging point; and a spatial filter, disposed at a position of a diffraction image plane, for selectively blocking a part of said illumination light transmitted through or reflected by said sample, said diffraction image plane being orthogonal to an optical axis of said illumination light and including said converging point;

said objective lens being adapted to be focused on each of said diffraction image plane and said sample; said method comprising the step of changing the position 10 of converging

point of illumination light in the direction of optical axis of said objective lens to adjust the size of diffraction image.

37. (Amended) A microscope observing method using an optical microscope apparatus comprising illuminating means for emitting as an illumination light as a convergent beam which converges ~~converging~~ at a point in a space; a sample mounting table for mounting a sample in front of said converging point of said illumination light; an objective lens positioned after said converging point such that said illumination light is incident thereon, wherein said illumination light is transmitted through or reflected by said sample and wherein said illumination light converges at ~~disposed such that said illumination light is incident thereon after light transmitted through or reflected by said sample is once converged at said converging point;~~ a polarizer disposed between said illuminating means and sample mounting table; an analyzer disposed between said sample mounting table and eyepiece; and a spatial filter, disposed at a position of a diffraction image plane, for selectively blocking a part of said illumination light transmitted through or reflected by said sample, said diffraction image plane being orthogonal to an optical axis of said illumination light and including said converging point; said objective lens being adapted to be focused on each of said diffraction image plane and said sample;

said method comprising the step of changing the position of converging point of illumination light in the direction of optical axis of said objective lens to adjust the size of diffraction image.

IN THE ABSTRACT OF DISCLOSURE:

The abstract is changed as follows:

The optical microscope apparatus comprises an illuminating element ~~means~~ for emitting as illumination light a convergent beam converging at a point in space; a sample mounting table for mounting a sample in front of the converging point of illumination light; and an objective lens disposed such that the illumination light is incident thereon after light transmitted through or reflected by the sample is once converged at the converging point. The texture and state of orientation of the sample can easily be analyzed by use of the optical microscope apparatus in accordance with the present invention.